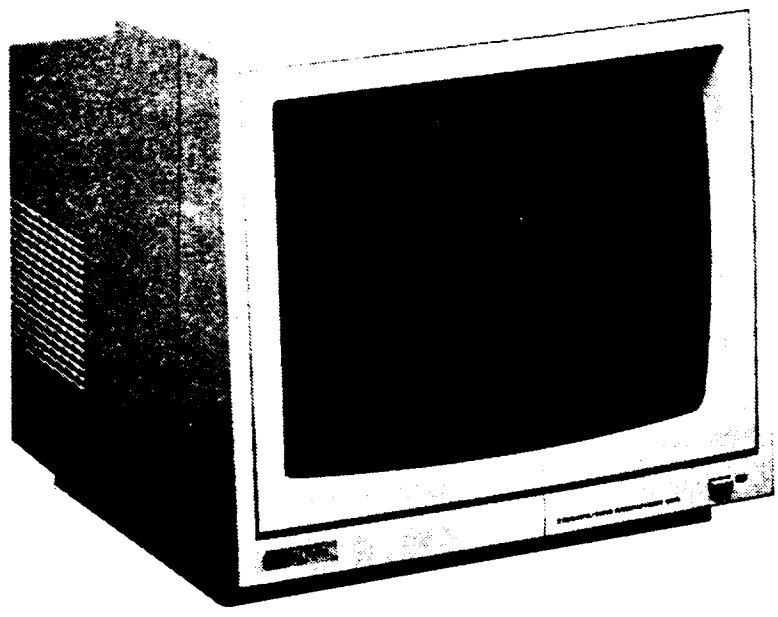
MONOCHROME MONITOR



SPECIFICATIONS

Picture Tube:	12″ measured diagonally with glare reducing surface treatment	Video Amp Bandwidth:	20MHz
Deflection Angle:	90°	Horizontal Resolution:	800 lines (BM7513, BM7523) 1,000 lines (7BM613, 7BM623)
Phosphor Type:	P39 Green (BM7513, 7BM613) LA Amber (BM7523, 7BM623)	Character Field:	25 lines of 80 characters (2,000 total)
Video Input Signal:	TTL level digital video, separate horizontal and vertical syncs. (7BM613, 7BM623)	Power Supply:	120Vac ± 10%, 50-60Hz
		Power Consumption:	30 Watts
		Dimensions:	11.9″W x 11.1″D x 10.9″H

*Subject to Modification

NAPCEC SAFETY GUIDELINES FOR THE PROFESSIONAL SERVICE TECHNICIAN

Safety Checks

After the original service problem has been corrected, a complete safety check should be made. Be sure to check over the entire set, not just the areas where you have worked. Some previous servicer may have left an unsafe condition, which could be unknowingly passed on to your customer. Be sure to check all of the following:

Fire and Shock Hazard

1. Be sure all components are positioned in such as way as to avoid the possibility of adjacent component shorts. This is especially important on those chassis which are transported to and from the service shop.
2. Never release a repaired receiver unless all protective devices such as insulators, barriers, covers, strain reliefs, and other hardware have been installed according to the original design.
3. Soldering and wiring must be inspected to locate possible cold solder joints, solder splashes, sharp solder points, frayed leads, pinched leads, or damaged insulation (including ac cord). Be certain to remove loose solder balls and all other loose foreign particles.
4. Check across-the-line components and other components for physical evidence of damage or deterioration and replace if necessary. Follow original layout, lead length and dress.
5. No lead or component should touch a receiving tube or a resistor rated at 1 watt or more. Lead tension around protruding metal surfaces or edges must be avoided.
6. Critical components having special safety characteristics are identified with an S by the Ref. No. in the parts list and enclosed within a broken line* along with the safety symbol on the schematics. Replacement parts without the same safety characteristics may create shock, fire or other hazards.
7. When servicing any receiver, always use a separate isolation transformer for the chassis. Failure to use a separate isolation transformer may expose you to possible shock hazard, and may cause damage to servicing instruments.
8. Many receivers use a polarized line cord (one wide pin on the plug). Defeating this safety device may create a potential hazard to the servicer and the user. Extension cords which do not incorporate the polarizing feature should never be used.
9. After re-assembly of the set, always perform an ac leakage test or resistance test from the line cord to all exposed metal parts of the cabinet. Also, check all metal control shafts (with knobs removed), antenna terminals, handles, screws, etc. to be sure the set is safe to operate without danger of electrical shock.

*Broken line: — · — · — · — ·

Implosion

1. All picture tubes used in current model receivers are equipped with an integral implosion system. Care should always be used, and safety glasses worn, whenever handling any picture tube. Avoid scratching or otherwise damaging the picture tube during installation.
2. Use only replacement tubes as specified by the manufacturer.

X-radiation

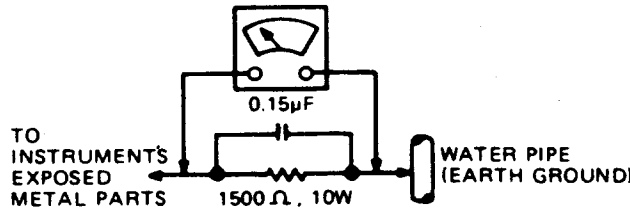
1. Be sure procedures and instructions to all your service personnel cover the subject of X-radiation. Potential sources of X-rays in TV receivers are the picture tube and the high voltage circuits. The basic precaution which must be exercised is to keep the HB at the factory recommended level.
2. To avoid possible exposure to X-radiation and electrical shock, only the manufacturer's specified anode connectors must be used.
3. It is essential that the service technician has available at all times an accurate HV meter. The calibration of this meter should be checked periodically against a reference standard.
4. When the HV circuitry is operating properly there is no possibility of an X-radiation problem. High voltage should always be kept at the manufacturer's rated value—no higher—for optimum performance. Every time a color set is serviced, the brightness should be run up and down while monitoring the HV with a meter to be certain that the HV does not exceed the

specified value and that it is regulated correctly. We suggest that you and your service technicians review test procedures so that HV and HV regulation are always checked as a standard servicing procedure, and the reason for this prudent routine be clearly understood by everyone. It is important to use an accurate and reliable HV meter. It is recommended that the HV reading be recorded on each customers' invoice, which will demonstrate a proper concern for the customers' safety.

5. When troubleshooting and making test measurements in a receiver with a problem of excessive high voltage, reduce the line voltage by means of a Variac to bring the HV into acceptable limits while troubleshooting. Do not operate the chassis longer than necessary to locate the cause of the excessive HV.
6. New type picture tubes are specifically designed to withstand higher operating voltages without creating undesirable X-radiation. It is strongly recommended that any shop test fixture which is to be used with the new higher voltage chassis be equipped with one of the new type tubes designed for this service. Addition of a permanently connected HV meter to the shop test fixture is advisable. The CRT types used in these new sets should never be replaced with any other types, as this may result in excessive X-radiation.
7. It is essential to use the specified picture tube to avoid a possible X-radiation problem.
8. Most TV receivers contain some type of emergency "Hold Down" circuit to prevent HV from rising to excessive levels in the presence of a failure mode. These various circuits should be understood by all technicians servicing them, especially since many hold down circuits are inoperative as long as the receiver performs normally.

Leakage Current Cold Check

1. Unplug the ac line cord and connect a jumper between the two prongs of the plug.
2. Turn on the power switch.
3. Measure the resistance value between the jumpered ac plug and all exposed cabinet parts of the receiver, such as screw heads, antennas and control shafts. When the exposed metallic part has a return path to the chassis, the reading should be between 1 megohm and 5.2 megohms. When the exposed metal does not have a return path to the chassis, the reading must be infinity. Remove the jumper from the ac line cord.



Leakage Current Hot Check

1. Do not use an isolation transformer for this test. Plug the completely re-assembled receiver directly into the ac outlet.
2. Connect a 1.5k ohm, 10 watt resistor paralleled by a 0.15uF. capacitor between each exposed metallic cabinet part and a good earth ground such as a water pipe, as shown above.
3. Use an ac voltmeter with at least 5000 ohms/volt sensitivity to measure the potential across the resistor.
4. The potential at any point should not exceed 0.75 volts. A leakage current tester may be used to make this test; leakage current must not exceed 0.5 milliamps. If a measurement is outside the limits specified, there is a possibility of shock hazard. The receiver should be repaired and re-checked before returning it to the customer.
5. Repeat the above procedure with the ac plug reversed. (Note: An ac adapter is necessary when a polarized plug is used. Do not defeat the polarizing feature of the plug.)

Picture Tube Replacement

The primary source of X-radiation in this television is the picture tube. The picture tube utilized in this chassis is specially constructed to limit X-radiation emissions. For continued X-radiation protection, the replacement must be the same type as the original, including suffix letter, or an N.A.P. Consumer Electronics Corp. (NAPCEC) approved type.

Parts Replacement

Many electrical and mechanical parts in NAPCEC television sets have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. The use of a substitute part which does not have the same safety characteristics as the NAPCEC recommended replacement part shown in this service manual may create shock, fire or other hazards.

CIRCUIT DESCRIPTION

This monitor can be used as an alphanumeric and graphic display unit for the home and personal computers. The screen is anti-reflecting which means that the legibility of the image is extremely good. The monitor has composite video signal input.

The monitor operates on a supply of 120V, 60Hz ac. The Power Transformer and CRT are mounted internally to the cabinet. The main panel has a Video Preamplifier, Sync Channel, Vertical and Horizontal Sweep Circuitry, Power Supply Horizontal AFC, and Blanking Circuits. The On/Off control Video Gain Control and Brightness Control are mounted on the main panel and extend through the cabinet front. The circuit adjustments are mounted to the main panel.

Power Supply
120 volt, 60Hz ac operation. The ac section of this receiver is designed for operation on 120 volt, 60Hz alternating current only. Never connect power cord to a supply having a different frequency or voltage.

Overload Protection
This receiver incorporates a .5 amp Slow-Blow fuse and a 2 amp fuse in the ac circuit. These fuses provide protection to the chassis against certain electrical overloads.

ADJUSTMENTS

B+ Adjust (R106)
Connect dc voltmeter to the collector of TS101 and allow receiver and test equipment to warm up for 20 minutes. Using a non-metallic tool, adjust R106 to obtain 11Vdc ± 1% on voltmeter.

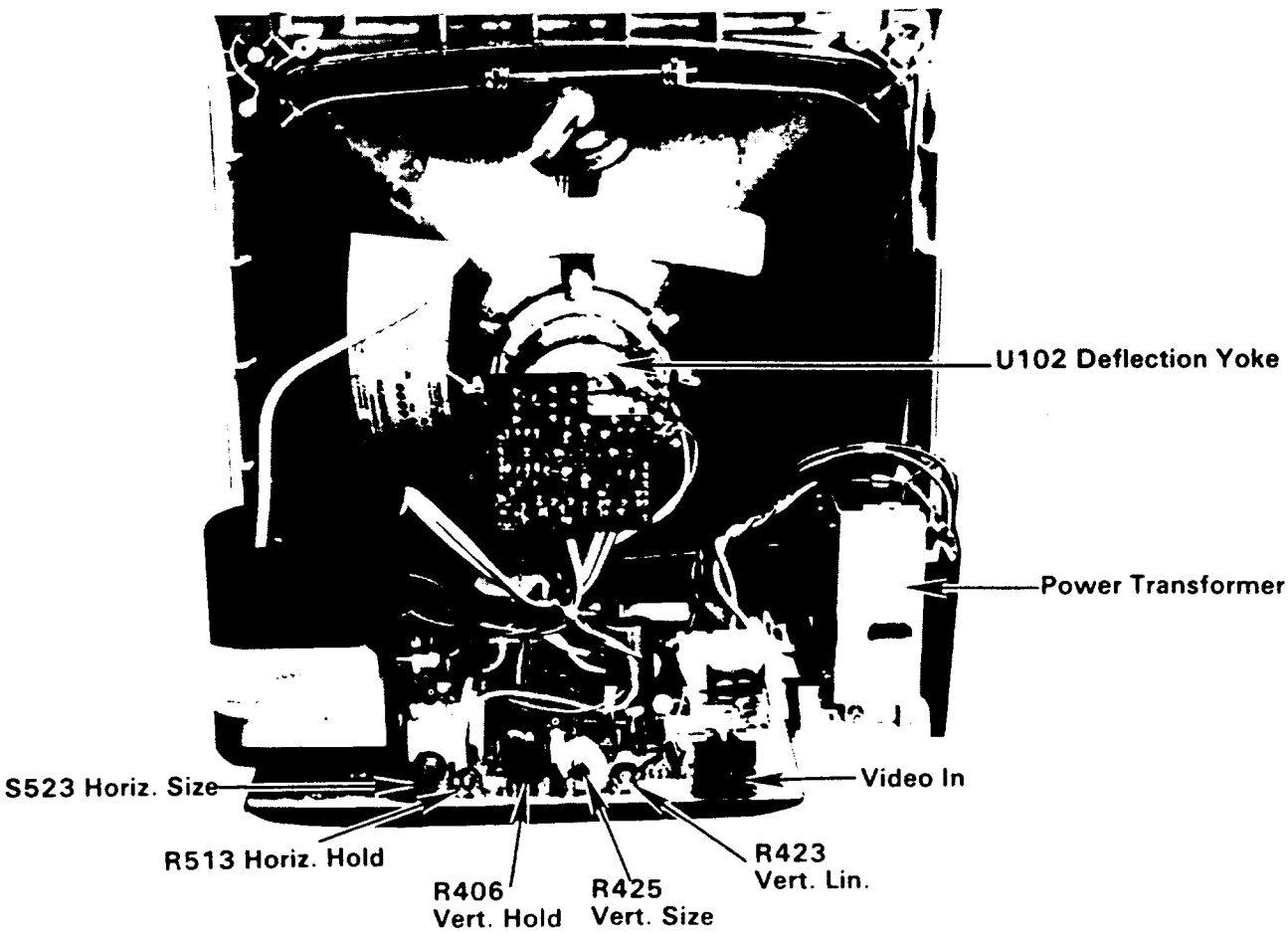
Focus (R336)
Adjust Focus Control for best overall detail in the center portion of the picture.

Horizontal Oscillator Adjustment (R513)
Short C503 and R544 to ground. Adjust R513 for horizontal stability of picture. Remove short between C503 and R544.

Vertical Size (R425)
Adjust the Vertical Size control (R425) to fill the screen vertically.

Horizontal Size (S523)
Adjust horizontal size to fill up screen.

Vertical Linearity (R423)
Adjust vertical linearity control for equal spacing of horizontal lines at the upper portion of the center of the screen.



Adjustment Location — Rear View

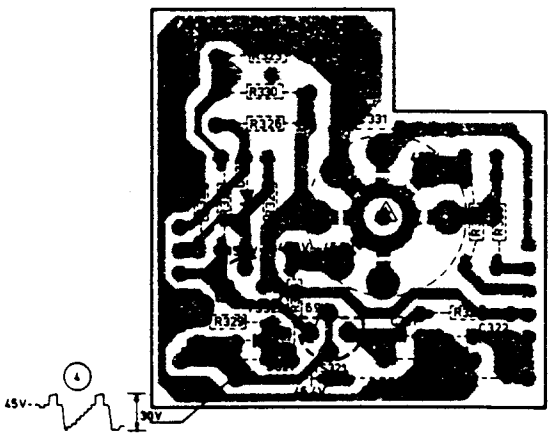
Chassis Removal

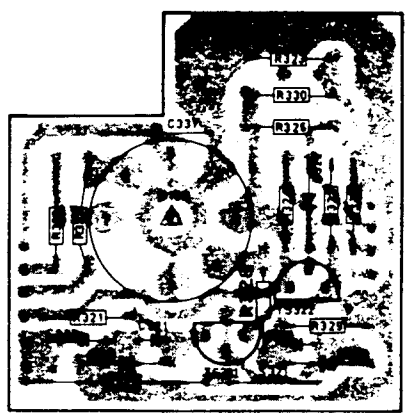
1. Remove six (6) screws, four (4) of which are securing cabinet back to cabinet front.
2. Lay cabinet face down on a soft material to protect picture tube and cabinet finish.
3. Chassis Removal — Slide printed circuit board assembly to rear as far as leads will allow for servicing.
4. Place chassis on the heat sink of TS101. In this position the monitor remains stable on the work bench.
5. Disconnect the picture tube socket and high voltage anode lead at picture tube.
6. Loosen clamp screw securing deflection yoke to picture tube. Slide the yoke to the rear until clear of the neck of the picture tube.
   Caution: Before removing high voltage lead at picture tube, discharge picture tube high voltage anode to ground only.
7. To replace components, reserve the above procedure.
8. **Note: Backcover Replacement - Printed Circuit Board must slide into proper tracks in backcover.**

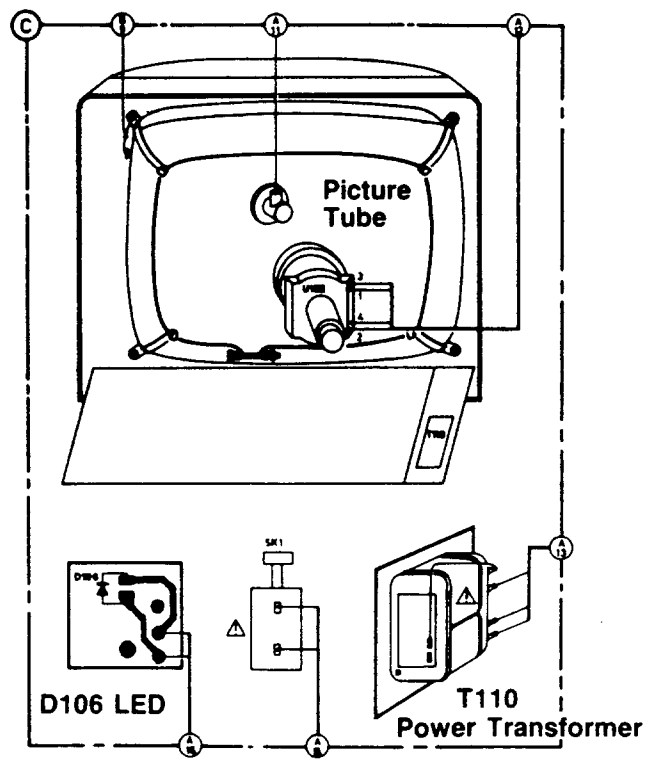
Picture Tube Removal

1. Disconnect HV anode lead and picture tube socket from picture tube. Loosen clamp screw securing deflection yoke and slide yoke off neck of picture tube.
2. Lay cabinet face down on a soft material so as not to scratch or mar the face of the picture tube or finish on cabinet.
3. Slide printed circuit board assembly out of track.
4. Remove screws from each of four (4) brackets holding picture tube in place. Slip mounting wire over neck of tube.
5. Using goggles and gloves, reach under face of tube and lift from cabinet. **Do not grasp neck of picture tube at any time.**
6. To install picture tube, reverse the preceding steps. Exercise caution not to scratch face of picture tube.

CRT Board







MEASUREMENTS

Important
Read these instructions carefully and observe the conditions noted when taking voltage readings or observing waveforms.

Picture tube high voltage anode may have a potential 10kV. Observe all high voltage precautions when servicing the chassis. Use safety goggles and gloves when handling the picture tube.

Voltage Measurement Conditions Unless Otherwise Specified

1. Voltages measured to chassis using a digital voltmeter.
2. AC power source 120V, 60Hz line.
3. Voltage readings not in brackets taken using a pattern generator (PM5519) as a signal source.
4. Brightness control set at minimum, and contrast control to maximum.
5. Voltage values shown are average readings. Variations may be observed due to normal production tolerances.

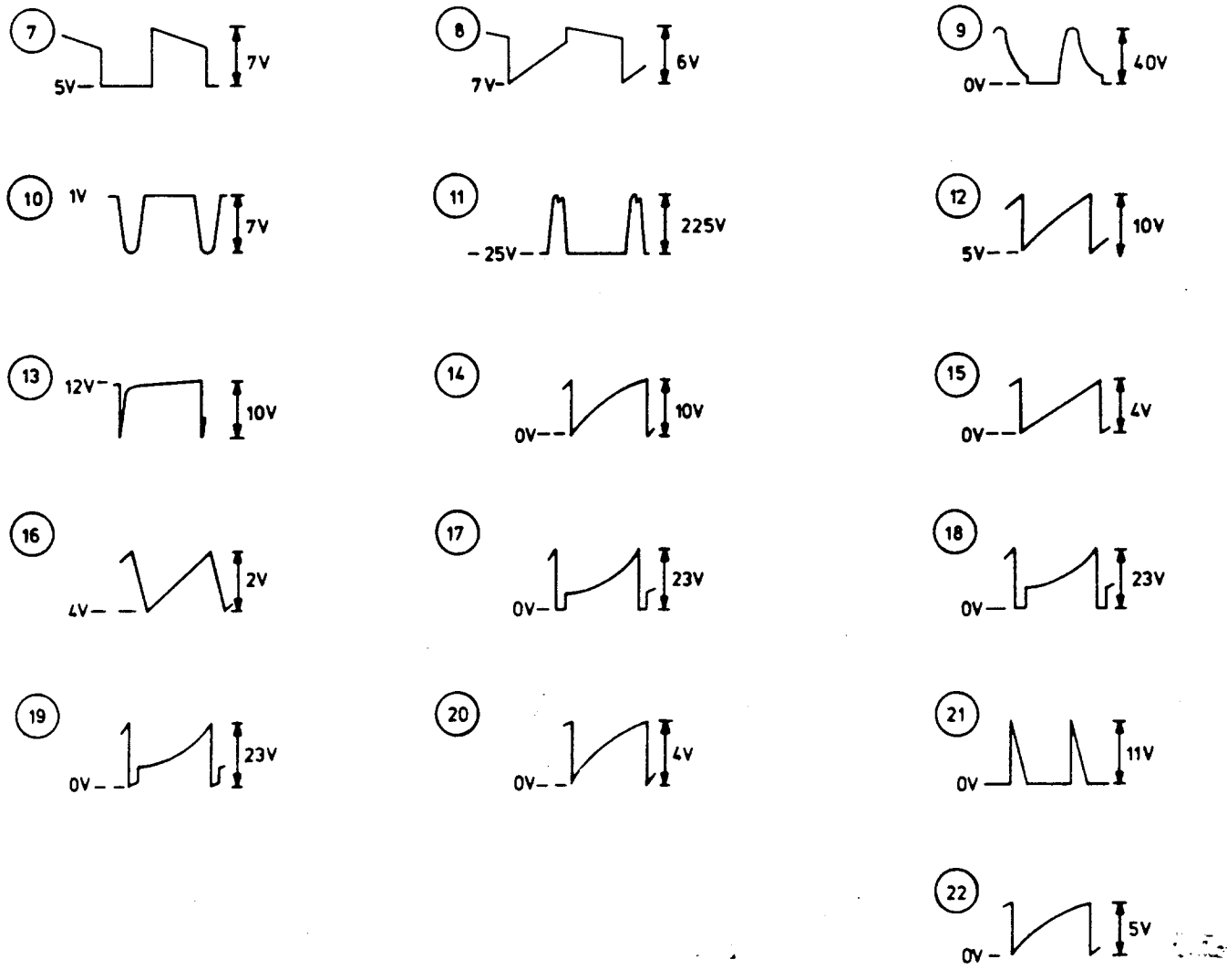
Special Voltage Measurement Conditions
Picture tube anode voltage measured with VTVM high voltage probe at line voltage of 120 volts at 100μA beam current.

Waveform Measurement Conditions

1. Waveforms taken using a pattern generator connected to the input plug of the monitor.
2. The video output signal of the generator adjusted to 1 volt.
3. Brightness control and contrast control set at maximum.

General Schematic Notes — See "Notes" on Schematic Diagram

Waveforms



REPLACEMENT PARTS LIST

TO ENSURE OPTIMUM PERFORMANCE AND RELIABILITY ALWAYS USE GENUINE FACTORY REPLACEMENT PARTS

WARNING

Critical components having special safety characteristics are identified with an S by the Ref. No. in the parts list and enclosed within a broken line* along with the safety symbol ⚠ on the schematics or exploded views.

Use of substitute replacement parts which do not have the same specified safety characteristics may create shock, fire, or other hazards.

Under no circumstances should the original design be modified or altered without written permission from the N.A.P. Consumer Electronics Corp. NAPCEC assumes no liability, express or implied, arising out of any unauthorized modification of design. Servicer assumes all liability.

*Broken line: — . — . — . — .

CAPACITORS (All Ceramic, 50V unless otherwise specified)			
S	C101	2.2nF., 100V, Cer. Disc.	
S	C102	2.2nF., 100V, Cer. Disc.	4H12231989
S	C103	2.2nF., 100V, Cer. Disc.	4H12231989
	C104	3300μF., 25V, Electrolytic	4H12421466
	C105	100pF., 50V, Cer. Disc.	4H12232156
	C106	10nF., 63V, Electrolytic	
	C107	330nF., 16V, Electrolytic	
S	C110	47nF., 125V, AC	4H12141348
S	C111	2.2nF., 125V, AC	4H12232194
S	C112	2.2nF., 125V, AC	4H12232194
	C301	2.2nF., 63V, Electrolytic	
	C302	470nF., 100V, Cer. Disc.	
	C303	22nF., 63V, Cer. Disc.	
	C304	100nF., 25V, Electrolytic	
	C305	27pF., 100V, Cer. Disc.	
	C321	22nF., 63V, Cer. Disc.	
	C322	100nF., 100V, Cer. Disc.	
	C323	100nF., 100V, Cer. Disc.	4H12421678
	C331	100nF., 400V, Cer. Disc.	
	C341	1nF., 63V, Electrolytic	
	C342	15nF., 63V, Cer. Disc.	
	C343	10nF., 63V, Electrolytic	
	C401	10nF., 100V, Cer. Disc.	
	C402	10nF., 100V, Cer. Disc.	
	C403	4.7nF., 100V, Cer. Disc.	
	C404	3.3, 100V, Cer. Disc.	
	C405	270pF., 100V, Cer. Disc.	
	C406	10nF., 400V, Cer. Disc.	
	C421	220nF., 100V, Cer. Disc.	
	C422	56nF., 100V, Cer. Disc.	
	C423	820pF., 50V, Cer. Disc.	4H12232157
	C424	220pF., 100V, Cer. Disc.	
	C431	270pF., 100V, Cer. Disc.	
	C432	100pF., 50V, Cer. Disc.	4H12232156
	C433	100nF., 25V, Electrolytic	
	C434	220nF., 25V, Electrolytic	
	C435	4.7nF., 100V, Electrolytic	
	C501	2nF, 400V, Cer. Disc.	
	C502	680pF., 100V, Cer. Disc.	
	C503	15nF., 400V, Cer. Disc.	
	C504	560pF., 500V, Cer. Disc.	
	C505	4.7nF., 100V, Cer. Disc.	
	C506	10nF., 100V, Cer. Disc.	
	C507	4.7nF., 63V, Electrolytic	
	C508	270pF., 100V, Cer. Disc.	
	C511	1.5nF., 100V, Cer. Disc.	

CAPACITORS (Continued)			
	C512	1.5nF., 100V, Cer. Disc.	
	C513	5.6nF., 100V, Polyester	4H12150625
	C514	10nF., 250V, Cer. Disc.	
	C515	100nF., 250V, Cer. Disc.	
	C521	47nF., 25V, Electrolytic	
	C522	47nF., 25V, Electrolytic	
	C523	22nF., 63V, Cer. Disc.	
	C524	100nF., 500V, Cer. Disc.	
	C525	22nF., 100V, Electrolytic	
	C526	560pF., 100V, Cer. Disc.	
	C527	4.7μF., 160V, Electrolytic	4H12440387
	C528	13nF., 400V, Polyester	4H12142192
	C531	10nF., 500V, Foil	4H12142191
	C602	22nF., 63V, Cer. Disc.	
	C603	22μF., 16V, Electrolytic	4H12440189
	C604	10nF., 100V, Cer. Disc.	
COILS & TRANSFORMERS			
	S321	6.8μF., Coil - Choke	4H15751998
	S523	Coil - Horizontal Width	4H15751717
	S524	Coil - Linearity	4H15751914
S	T110	Transformer - Power	4H14630509
S	T521	Transformer - Horiz. Output	4H15050051
S	T522	Transformer - Line Output	4H14010264
CONTROLS & SWITCHES			
S	SK1	Power Switch - On/Off	4H27611161
	R106	4.7k. B+ Adjust	4H10010236
	R303	470 ohm, Contrast	4H10020121
	R331	1 Meg., Brightness Pre-set	4H10010103
	R332	470k, Brightness	4H10020122
	R336	2 Meg., Focus	4H10120727
	R406	10k, Vertical Hold	4H10110547
	R423	47k, Vertical Linearity	4H10010076
	R425	330k, Vertical Size	4H10110548
	R513	330 ohm, Horizontal Hold	4H10020054
RESISTORS (unless otherwise specified, all are 5%, 1/4W)			
	R101	150 ohm	
	R102	1k	
	R103	1.2k	

Commodore Part Numbers are not available at this time.

REPLACEMENT PARTS LIST (Continued)

RESISTORS (Continued)		
R104	27k	
R105	15k	
R107	15k	
R108	1k	
R301	100 ohm	
R302	680 ohm	
R304	47 ohm	
R305	18k	
R306	4.7k	
R307	100 ohm	
R308	100 ohm	
R309	470 ohm	
R310	100k	
R311	1k	
R312	68k	
R313	4.3k	
R314	75 ohm	
R316	68 ohm	
R317	68 ohm	
R321	1k (BM7513), (BM7523)	
R321	820 ohm (7BM613), (7BM623)	
R322	680 ohm	
R323	1k	
R324	47k	
R325	18k	
R326	2.2k	
R327	1k, ¼W, Metal Film	5H11654403
R328	120 ohm, ½W	4H11043083
R329	330k	
R330	120 ohm	
R333	390k	
R335	270k	
R337	33k	4H11150482
R338	33k	4H11150482
R341	1.5 Meg.	
R342	2.2k	
R343	1k	
R344	1k	
R345	27k	
R401	6.8k	
R402	15k	
R403	24k	
R404	100k	
R405	27k	
R406	10k	
R407	33k	
R408	560 ohm	
R421	180k	
R422	120k	
R424	270k	
R426	330k	
R427	100k	
R428	430 ohm	
R429	1k	
R431	12k	
R432	10k	
R433	150 ohm	
R434	5.6 ohm	
R435	6.8k	
R436	1k	
R437	4.7 ohm	
R438	330 ohm	
R501	180k	

RESISTORS (Continued)		
R502	150k	
R504	10kR50512k	
R506	2.2k	
R511	560 ohm	
R512	2.7k	4H11652918
R514	2.2k	
R515	8.2k, Metal Film	4H11652865
R516	8.2k	
R517	6.8k, Metal Film	4H11653064
R518	18k	
R519	3.9k	
R520	1.2k	
R522	220 ohm	
R523	8.2 ohm, ¼W, Safety Resistor	4H1130506
R524	1.8 ohm	
R525	390 ohm	
S R526	1k, ¼W, Safety Resistor	4H11130561
S R527	5.6 ohm, ¼W, Safety Resistor	4H11130502
S R528	100 ohm, ¼W, Safety Resistor	4H11130535
R529	470 ohm	
R601	1k	
R602	1k	
R603	1k	
R604	1k	
R605	1.2k	
R606	1.2k	
R607	470 ohm	
R608	560 ohm	
R609	120 ohm	

SEMICONDUCTORS - DIODES		
S D101	Diode - Bridge Rectifier	4H13031174
S D102	Diode - Bridge Rectifier	4H13031174
S D103	Diode - Bridge Rectifier	4H13031173
S D104	Diode - Bridge Rectifier	4H13031173
D105	Diode - Zener	4H13034167
D321	Diode - Zener (BM7513), (BM7523)	4H13034278
D321	Diode - Zener (7BM613), (7BM623)	4H13030861
D322	Diode - Silicon	4H13030847
D323	Diode - Silicone	4H13030621
D331	Diode - Zener	4H13034197
D401	Diode - Zener	4H13034398
D431	Diode - Silicon	4H13030847
D432	Diode - Zener	5H13031931
D441	Diode - Silicon	4H13030621
D501	Diode - Silicon	4H13030847
D502	Diode - Silicon	4H13030847
D511	Diode - Silicon	4H13030847
D512	Diode - Silicon	4H13030847
D513	Diode - Silicon	4H13030621
D521	Diode - Silicon	4H13031168
D522	Diode - Zener	4H13034499
D523	Diode - Silicon	5H13034979
D524	Diode - Silicon	4H13034189
D525	Diode - Silicon	4H13034189
D526	Diode - Silicon	4H13041487
D601	Diode - Zener	4H13034233

SEMICONDUCTORS - TRANSISTORS		
TS101	Transistor - NPN	4H13042239
TS102	Transistor - PNP	4H13044197

Commodore Part Numbers are not available at this time.

REPLACEMENT PARTS (Continued)

SEMICONDUCTORS -TRANSISTORS		
TS103	Transistor - NPN	4H13044196
TS305	Transistor - NPN	4H13044246
TS321	Transistor - NPN (BM7513), (BM7523)	BF422
TS321	Transistor - NPN (7BM613), (7BM623)	4H13041589
TS322	Transistor - NPN	4H13044246
TS341	Transistor - PNP	4H13044197
TS401	Transistor - PNP	4H13044197
TS402	Transistor - NPN	4H13044196
TS421	Transistor - PNP	4H13044358
TS422	Transistor - NPN	4H13044196
TS431	Transistor - NPN	5H13044349
TS432	Transistor - PNP	4H13044283
TS441	Transistor - NPN	4H13044196
TS442	Transistor - NPN	4H13044196
TS443	Transistor - PNP	4H13044197
TS501	Transistor - PNP	4H13044358
TS511	Transistor - PNP	4H13044197
TS512	Transistor - PNP	4H13044197
TS513	Transistor - PNP	4H13041041
TS521	Transistor - NPN	4H13042241

SEMICONDUCTORS - INTEGRATED CIRCUITS		
IC601		5H20984997

MISCELLANEOUS			
S		CRT - Amber (7BM623), (BM7523)	M31344LAPD
S		CRT - Green (7BM613), (BM7513)	M31344GRPD
S		CRT - Socket	4H25570189
S	U102	Deflection Yoke	4H15010188
S	VL101	Fuse - .5A, 250V (7BM613), (7BM623)	4H25361006
S	VL101	Fuse - .5A, 250V (BM7513), (BM7523)	4H25310059
S	VL102	Fuse - 2A, 250V	4H25310045
S		Fuse - Thermal	4H25220007
		Socket - Jack	4H26720241
		Plug - Micro - Connector (BM7513), (BM7523)	4H26520235
		Din Plug (7BM613), (7BM623)	4H26440026
S	SK1	Power Switch - On/Off	4H27011161

CAPACITORS (unless specified, all are ceramic, 50V)		
C321	22nF., 63V	
C322	100nF., 100V	
C323	100nF., 100V	4H12421678
C331	100nF., 500V	

RESISTORS (unless specified, all are 5%, ¼W)		
R321	1k (BM7513), (BM7523)	
R321	820 ohm (7BM613), (7BM623)	
R322	680 ohm	
R323	1k	
R324	47k	
R325	18k	
R326	2.2k	
R327	1k	
R329	330k	
R330	120 ohm	
R337	33k	4H11150482
R338	33k	4H11150482

SEMICONDUCTORS - DIODES		
D321	Diode - Zener (BM7513), (BM7523)	4H13034278
D321	Diode - Zener (7BM613), (7BM623)	4H13030861
D322	Diode - Silicon	4H13030847
D323	Diode - Silicon	4H13030621

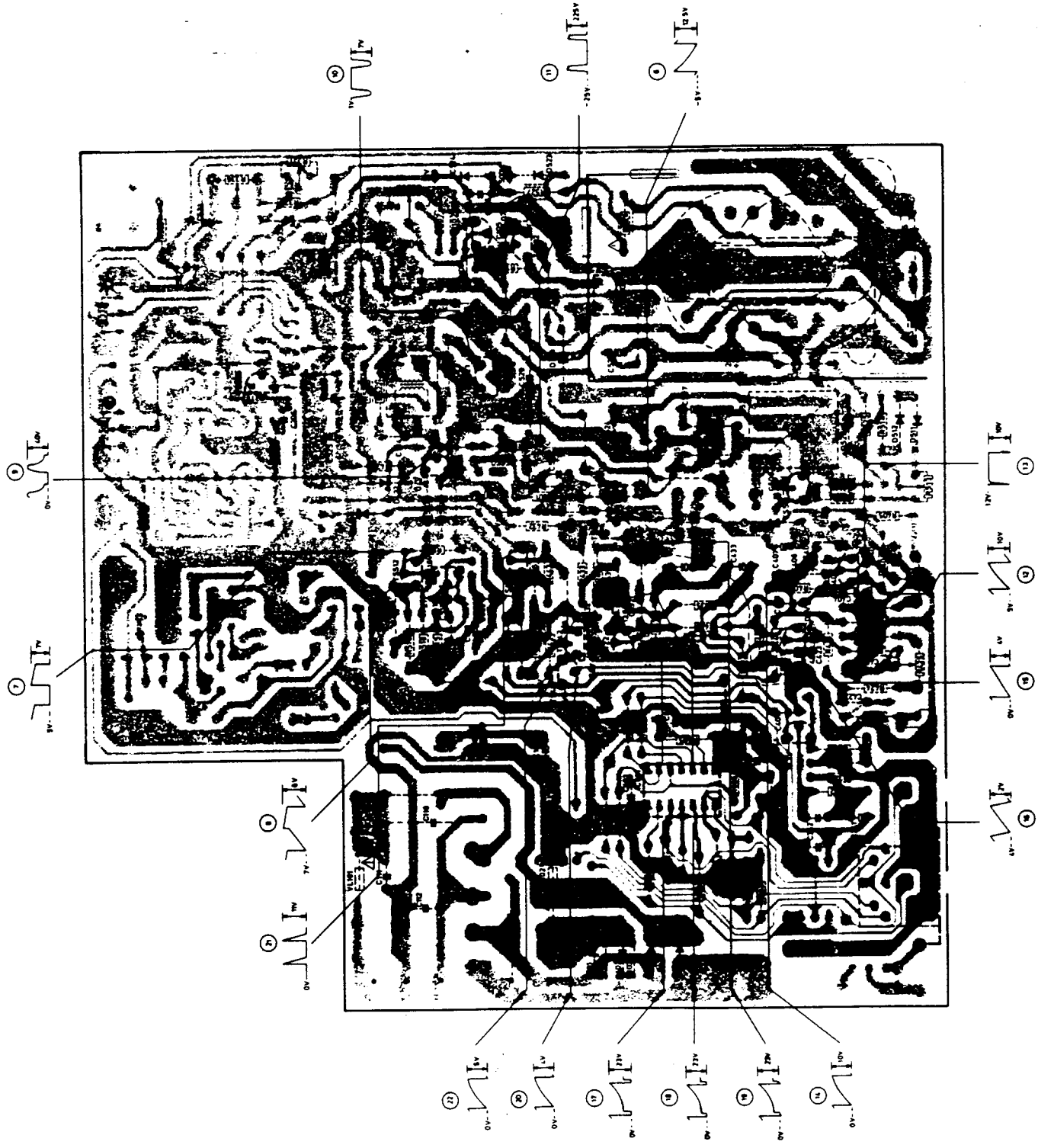
SEMICONDUCTORS - TRANSISTORS		
TS321	Transistor - NPN (BM7513), (BM7523)	BF422
TS321	Transistor - NPN (7BM613), (7BM623)	4H13041589
TS322	Transistor - NPN	4H13044246

LED BOARD		
D106	Diode - LED/Green (7BM613), (BM7513) (BM7513)	4H13042242
D106	Diode - LED/Amber (7BM623), (BM7523)	4H13032341

CABINET PARTS		
	Block Retainer f/AC Power Cord	4H46691447
	Cabinet (7BM613)	4H43070323
	Cabinet (7BM623)	4H43070327
	Cabinet (BM7513)	4H3070305
	Cabinet (BM7523)	4H43070304
	Adjusting Spindle f/Vert. Hold Horiz. Width & Vert. Size (3 used)	4H53591695
	Adjusting Spindle - Horiz. Phase	4H53570797
	Knob - Volume, Contrast, Brightness (3 used)	4H41023595
	Knob - Push Button (7BM613), (7BM623)	4H41024148
	Knobs (2 used) (7BM613), (7BM623)	4H41310239
	Foot f/Cabinet (7BM613), (7BM623)	4H46240788
	Foot f/Cabinet (BM7513), (BM7523)	4H46240699
S	AC Power Supply Cord	4H32110109
	Owner's Manual (BM7513), (BM7523)	4H73650736
	Owner's Manual (7BM613), (7BM623)	IB46060001

Commodore Part Numbers are not available at this time.

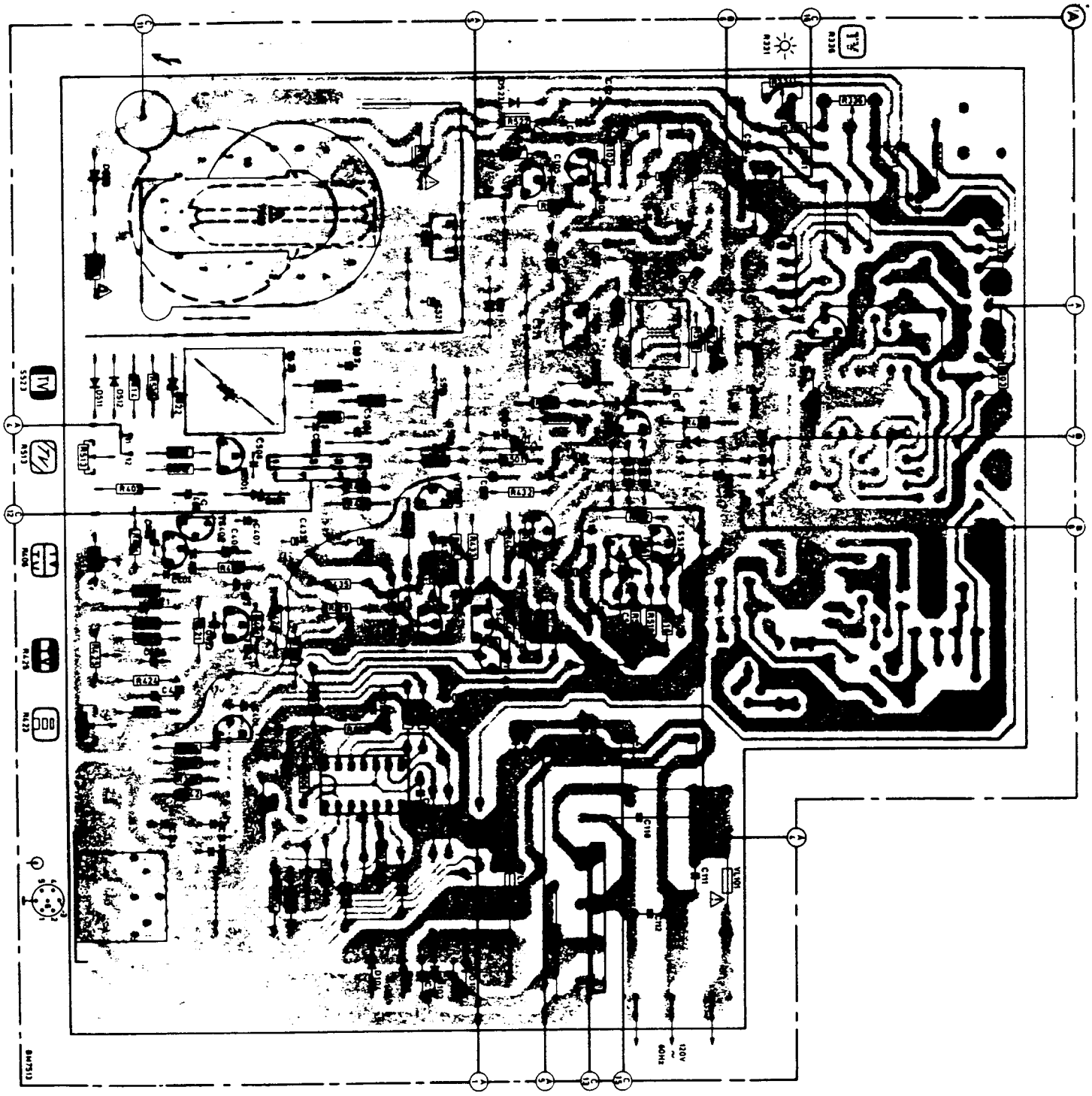
MAIN PANEL ASSEMBLY



Bottom View

Note: See page 6 for waveforms corresponding to respective waveform numbers.

MAIN PANEL ASSEMBLY



Top View

SCHEMATICS NOTES

UNLESS OTHERWISE SPECIFIED

1. ALL CAPACITORS ARE IN MFD. 50V UNLESS OTHERWISE SPECIFIED.
2. ALL RESISTORS ARE ¼ WATT, 5% UNLESS OTHERWISE SPECIFIED.
3. ARROWS ON CONTROLS INDICATE DIRECTION OF CLOCK-WISE ROTATION.
4. RESISTANCE SHOWN (COILS/TRANSFORMERS) ARE IN-CIRCUIT MEASUREMENTS.
5. SCHEMATIC SYMBOLS ③ ARE WAVEFORM TEST POINTS.
6. C613 IS USED FOR FACTORY ADJUSTMENT PURPOSES AND MAY NOT BE INCLUDED IN SOME RECEIVERS.
7. 1nF. = .001μF., 10nF. = .01μF., 100nF. = .1μF.

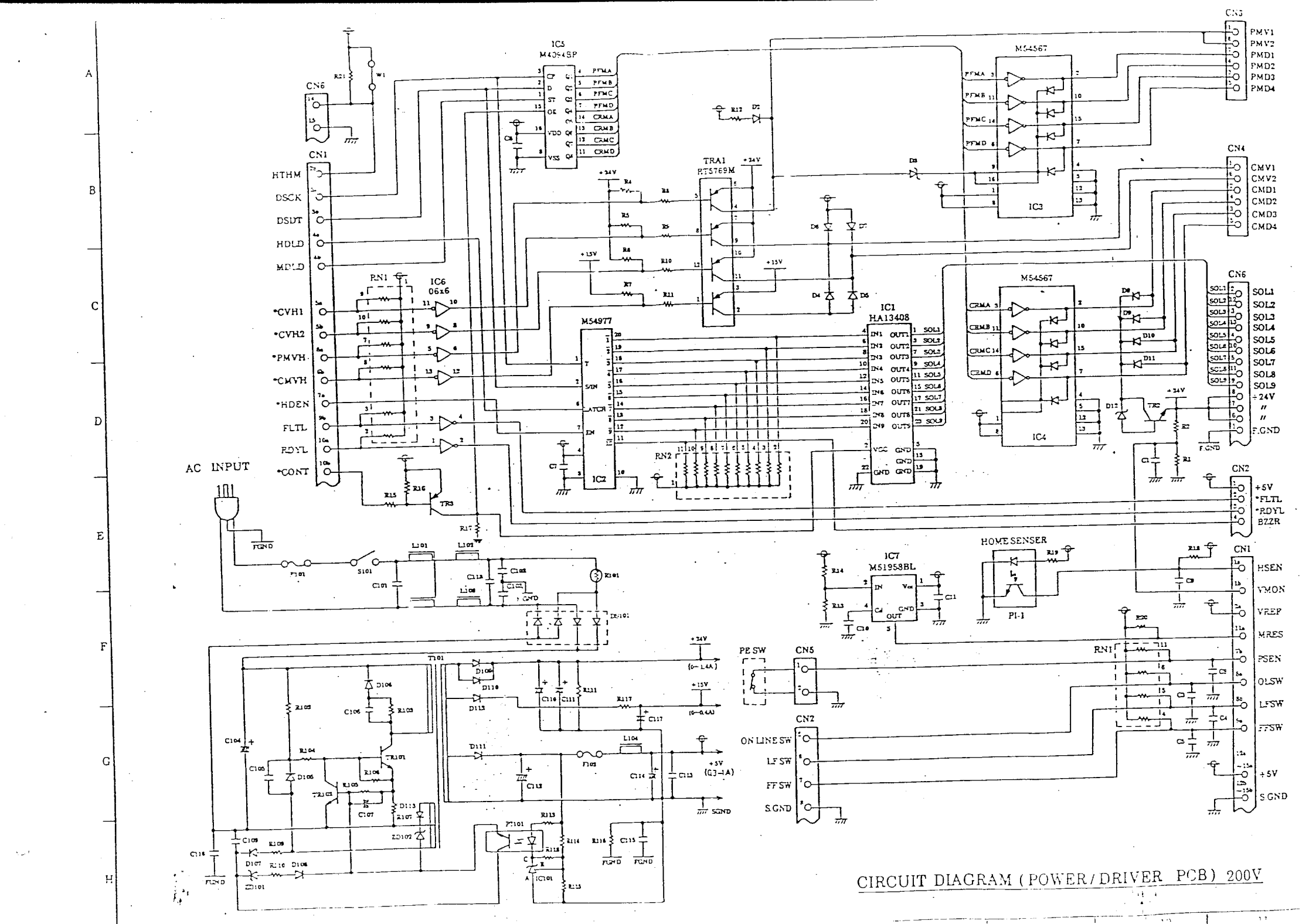
WARNING

Critical components having special safety characteristics are identified with an S by the Ref. No. in the parts list and enclosed within a broken line* along with the safety symbol ⚠ on the schematics or exploded views.

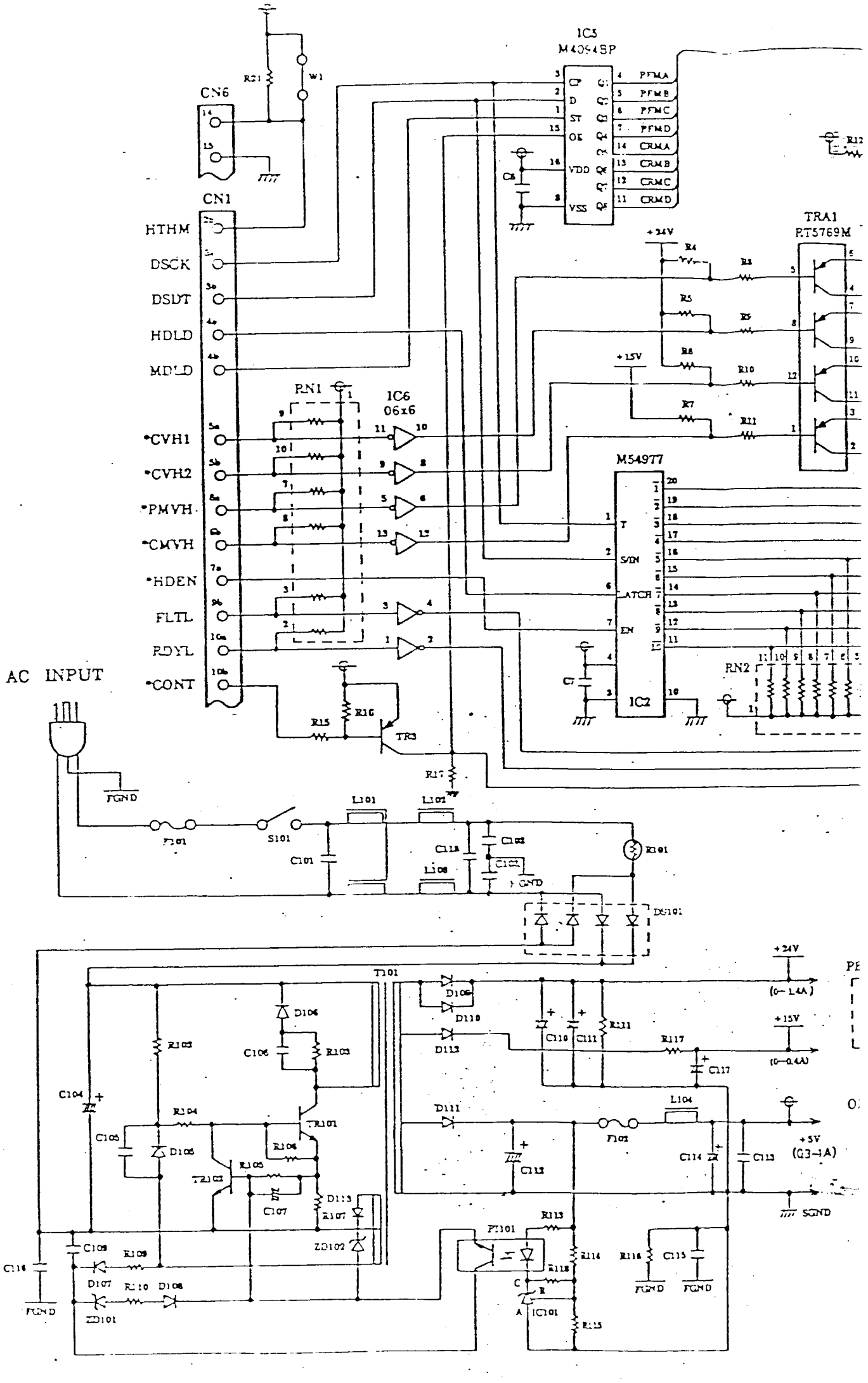
Use of substitute replacement parts which do not have the same specified safety characteristics may create shock, fire, or other hazards.

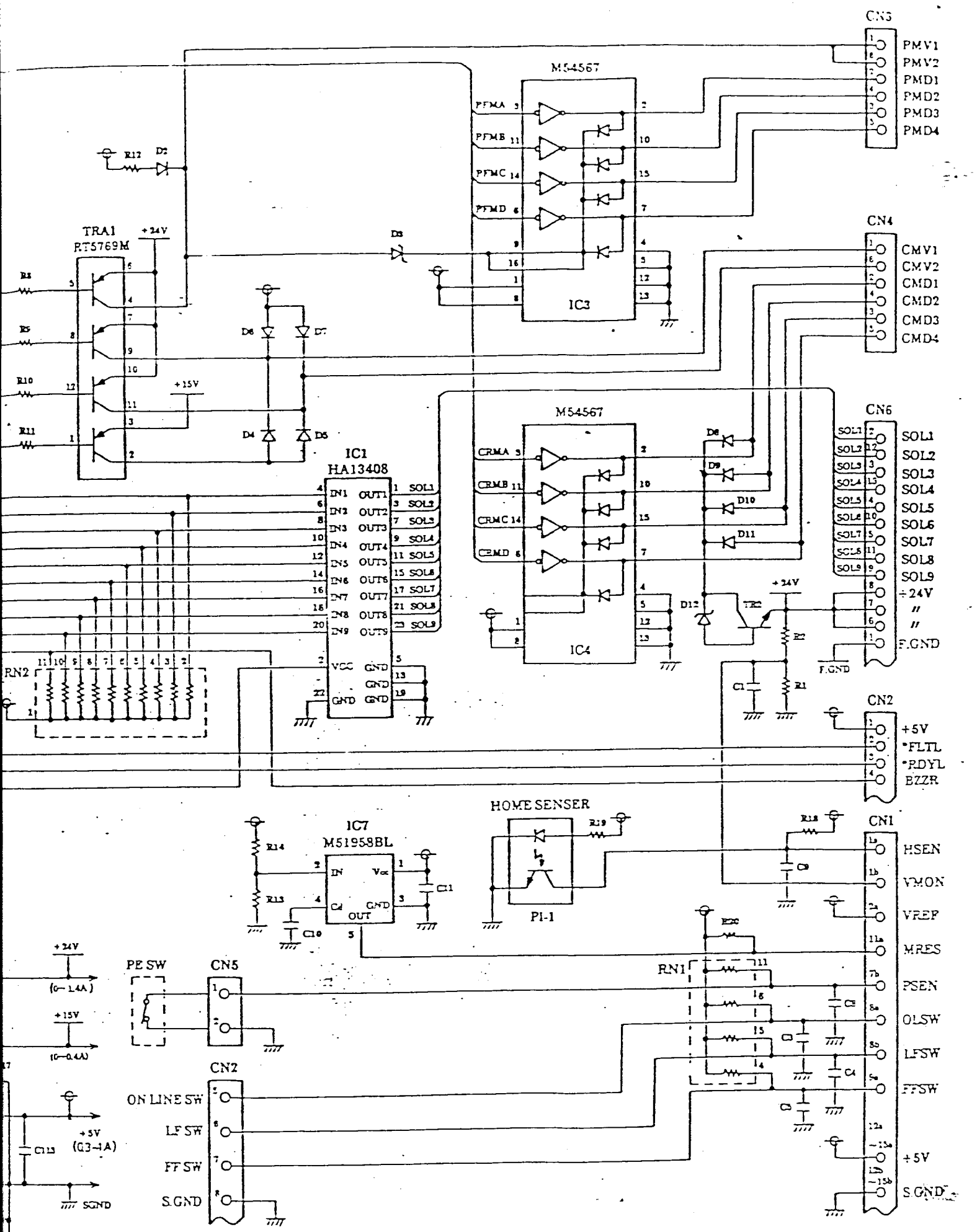
Under no circumstances should the original design be modified or altered without written permission from the N.A.P. Consumer Electronics Corp. NAPCEC assumes no liability, express or implied, arising out of any unauthorized modification of design. Servicer assumes all liability.

*Broken line: — · — · — · —

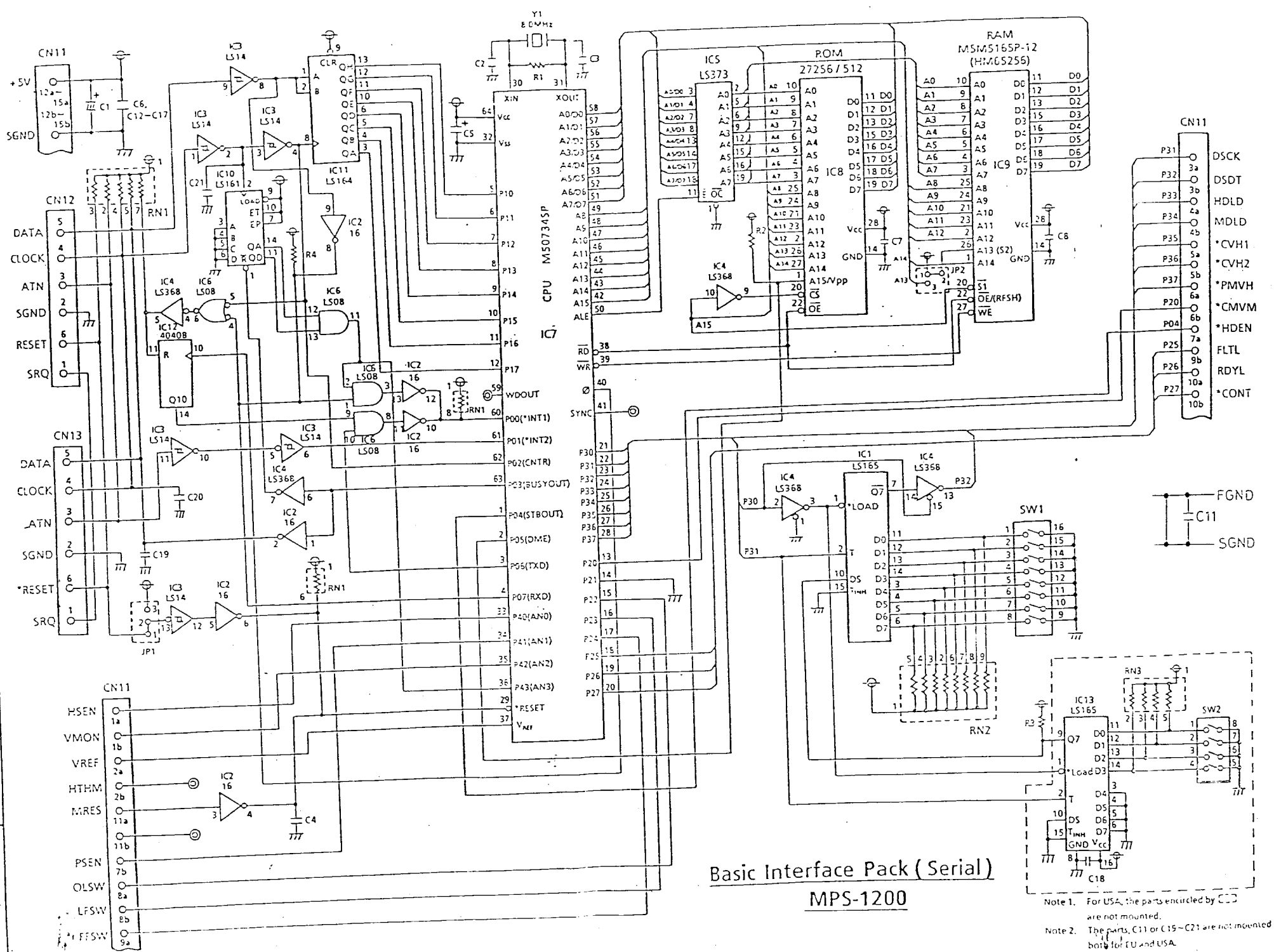


CIRCUIT DIAGRAM (POWER/DRIVER PCB) 200V


IC5
M4094SP
CN6
CN1
W1
R21
HTHM
DSCK
DSDT
HDLD
MDLD
*CVH1
*CVH2
*PMVH
*CMVH
*HDEN
FLTL
RDYL
*CONT
RN1
IC6
06x6
TRA1
RT5769M
+24V
+15V
R4
R5
R6
R7
R8
R9
R10
R11
M54977
IC2
RN2
C7
C8
AC INPUT
FGND
R15
R16
TR3
R17
F101
S101
L101
L102
C101
C102
C103
L103
GND
RV101
DB101
T101
D106
C106
R103
C104
R104
TR101
C105
D105
R106
R105
TR102
C107
D113
R107
ZD102
C109
R109
D107
R110
D108
ZD101
C116
FGND
D109
D110
D112
C110
C111
R111
R117
C117
+24V
(0~1.4A)
+15V
(0~0.4A)
D111
L104
F102
C112
C114
C113
+5V
(0.3~1A)
SGND
PT101
R113
R114
R118
C
E
A
IC101
R115
R116
C115
FGND
FGND



CIRCUIT DIAGRAM (POWER / DRIVER PCB) 200V

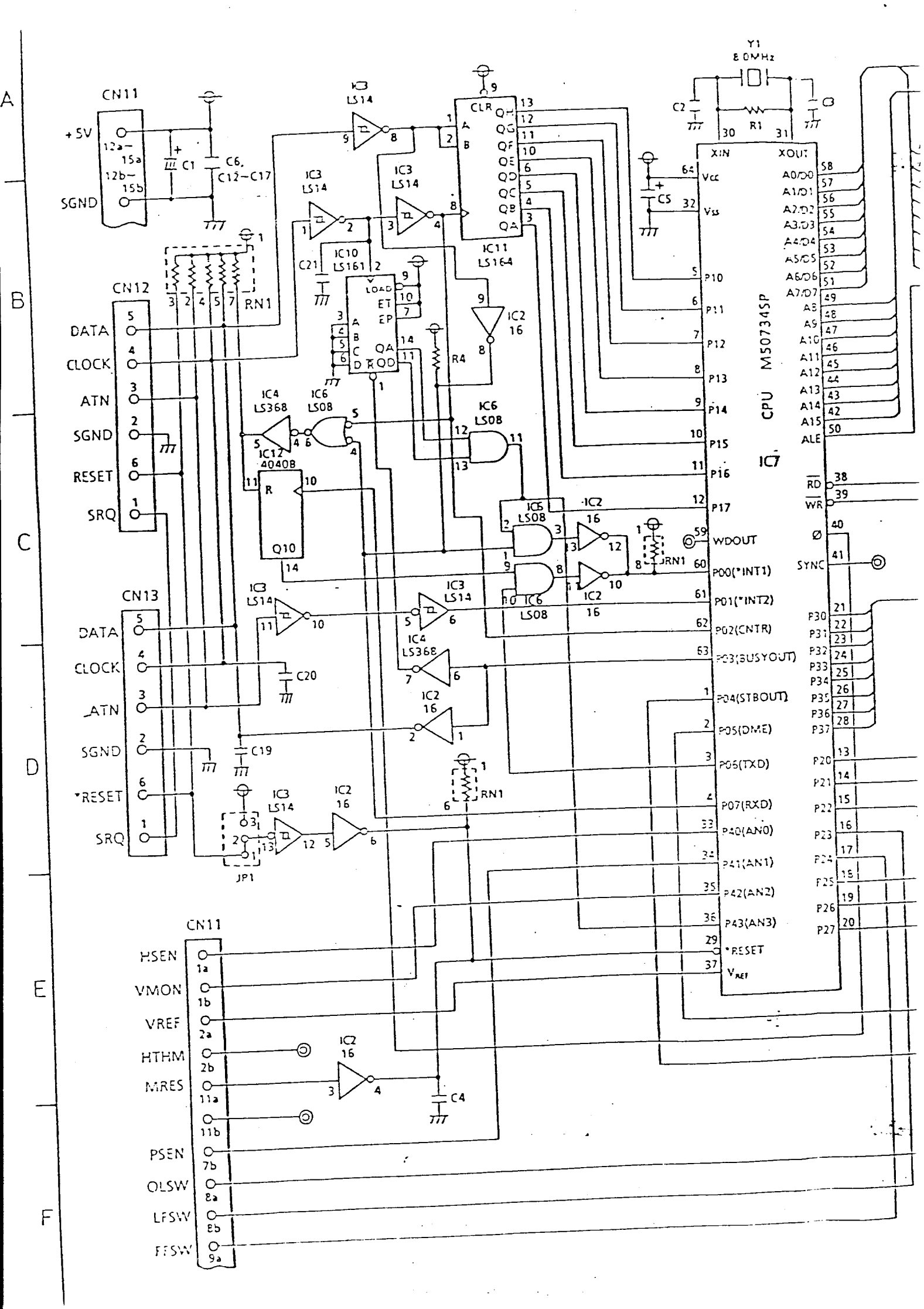


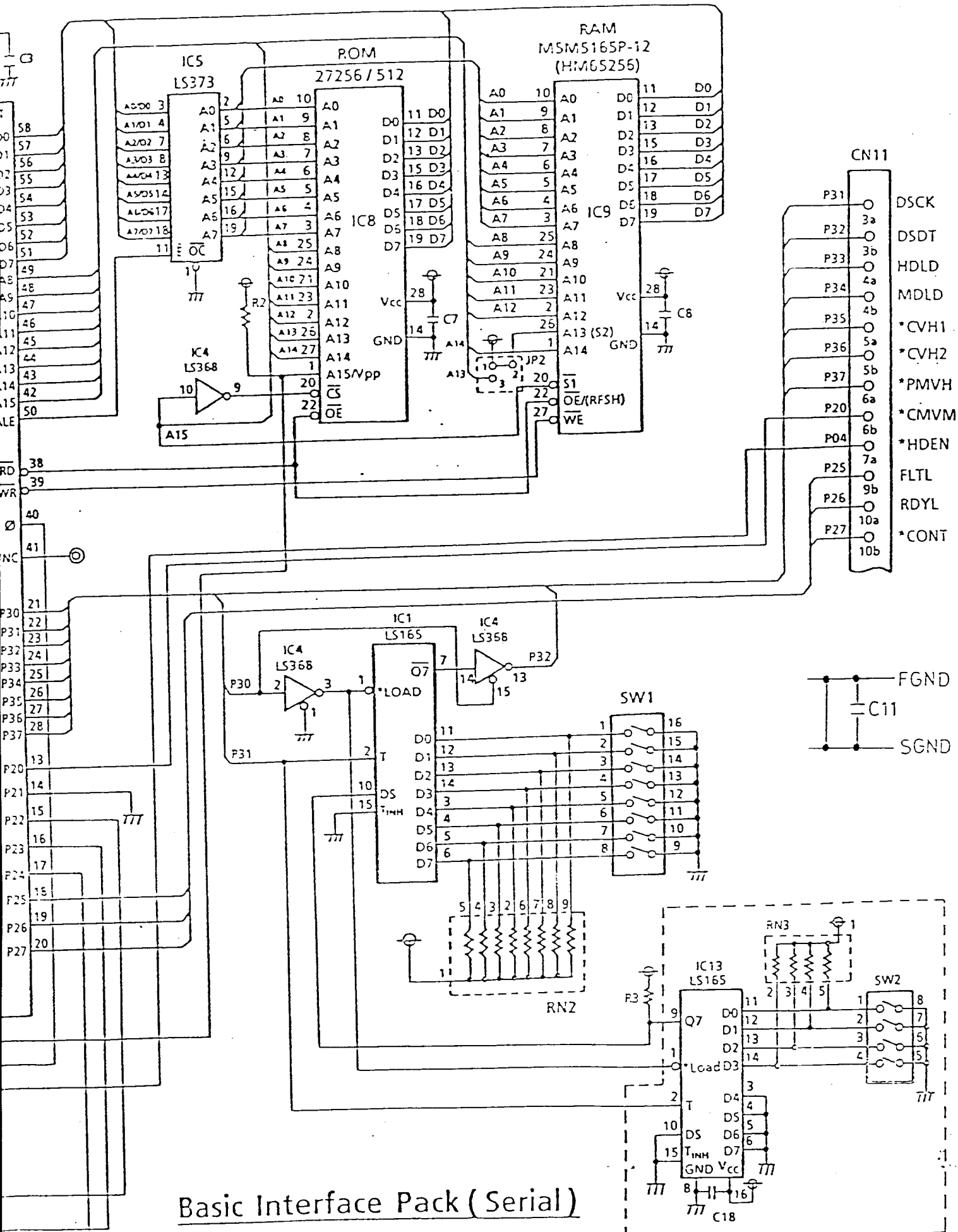
Basic Interface Pack (Serial)

MPS-1200

Note 1. For USA, the parts encircled by C11 are not mounted.

Note 2. The parts, C11 or C15–C21 are not mounted both for EU and USA.


CN11
+5V
SGND
12a–15a
12b–15b
C1
C6, C12–C17
IC3 LS14
IC10 LS161
IC11 LS164
IC2 16
IC4 LS368
IC6 LS08
IC12 4040B
RN1
R4
C21
CN12
DATA
CLOCK
ATN
SGND
RESET
SRQ
CN13
C20
C19
JP1
Y1 8.0MHz
C2
R1
C3
C5
X:IN
XOUT
CPU M50734SP
IC7
Vcc
Vss
P10
P11
P12
P13
P14
P15
P16
P17
WDOUT
P00(*INT1)
P01(*INT2)
P02(CNTR)
P03(BUSYOUT)
P04(STBOUT)
P05(DME)
P06(TXD)
P07(RXD)
P40(AN0)
P41(AN1)
P42(AN2)
P43(AN3)
*RESET
VREF
A0/D0
A1/D1
A2/D2
A3/D3
A4/D4
A5/D5
A6/D6
A7/D7
A8
A9
A10
A11
A12
A13
A14
A15
ALE
RD
WR
Ø
SYNC
P30
P31
P32
P33
P34
P35
P36
P37
P20
P21
P22
P23
P24
P25
P26
P27
CN11
HSEN
VMON
VREF
HTHM
MRES
PSEN
OLSW
LFSW
FFSW
C4

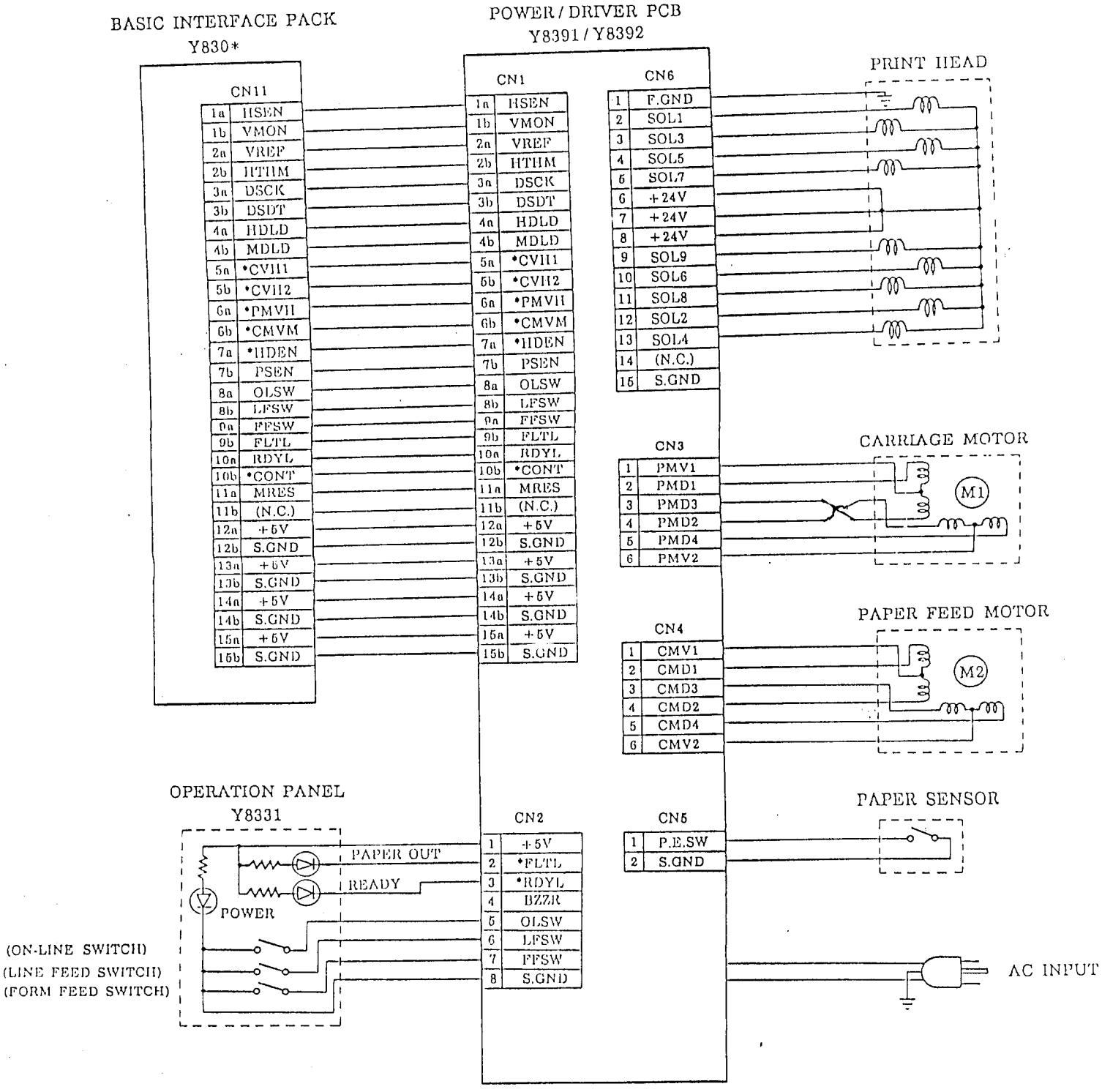


Basic Interface Pack (Serial)

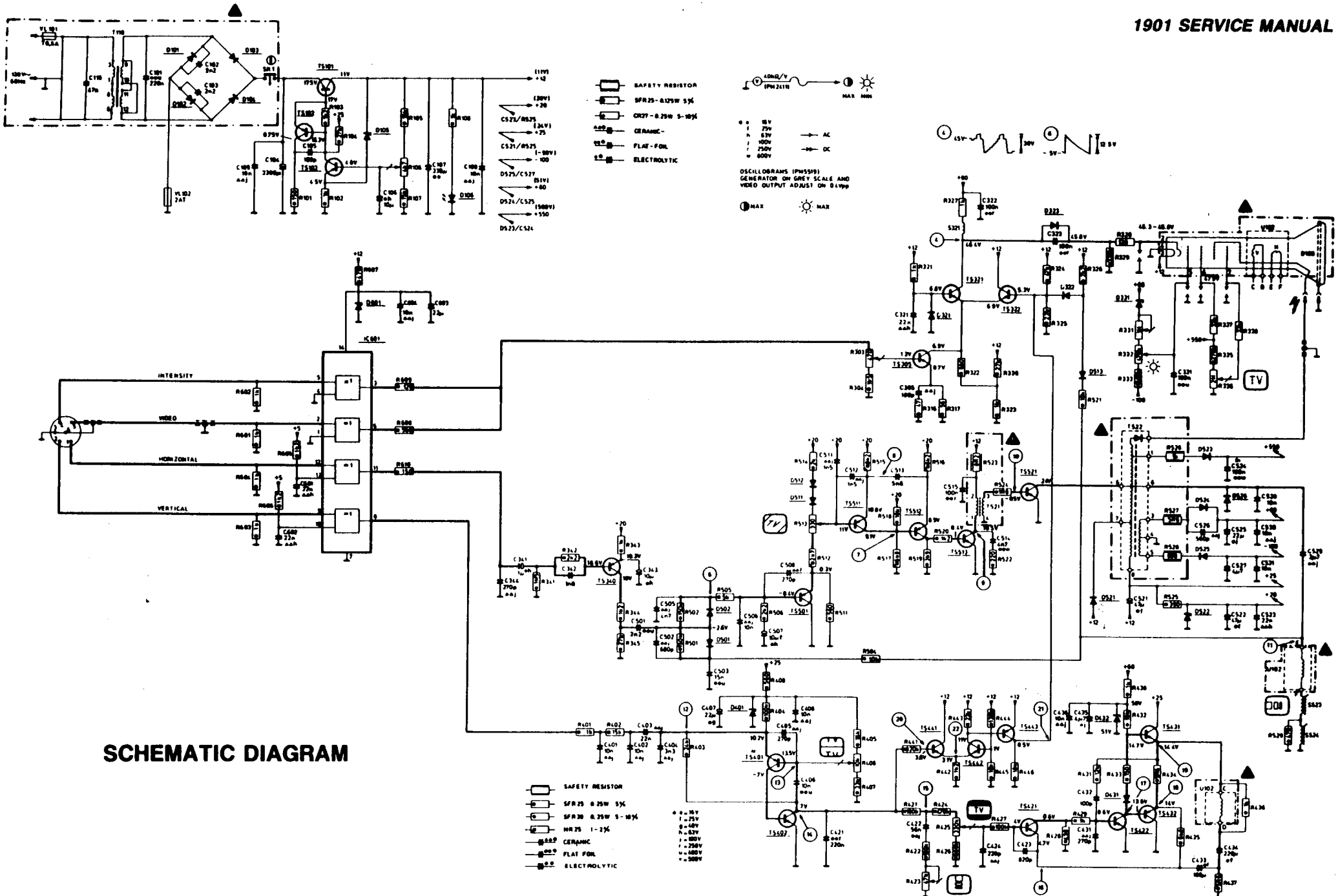
MPS-1200

Note 1. For USA, the parts encircled by [ ] are not mounted.

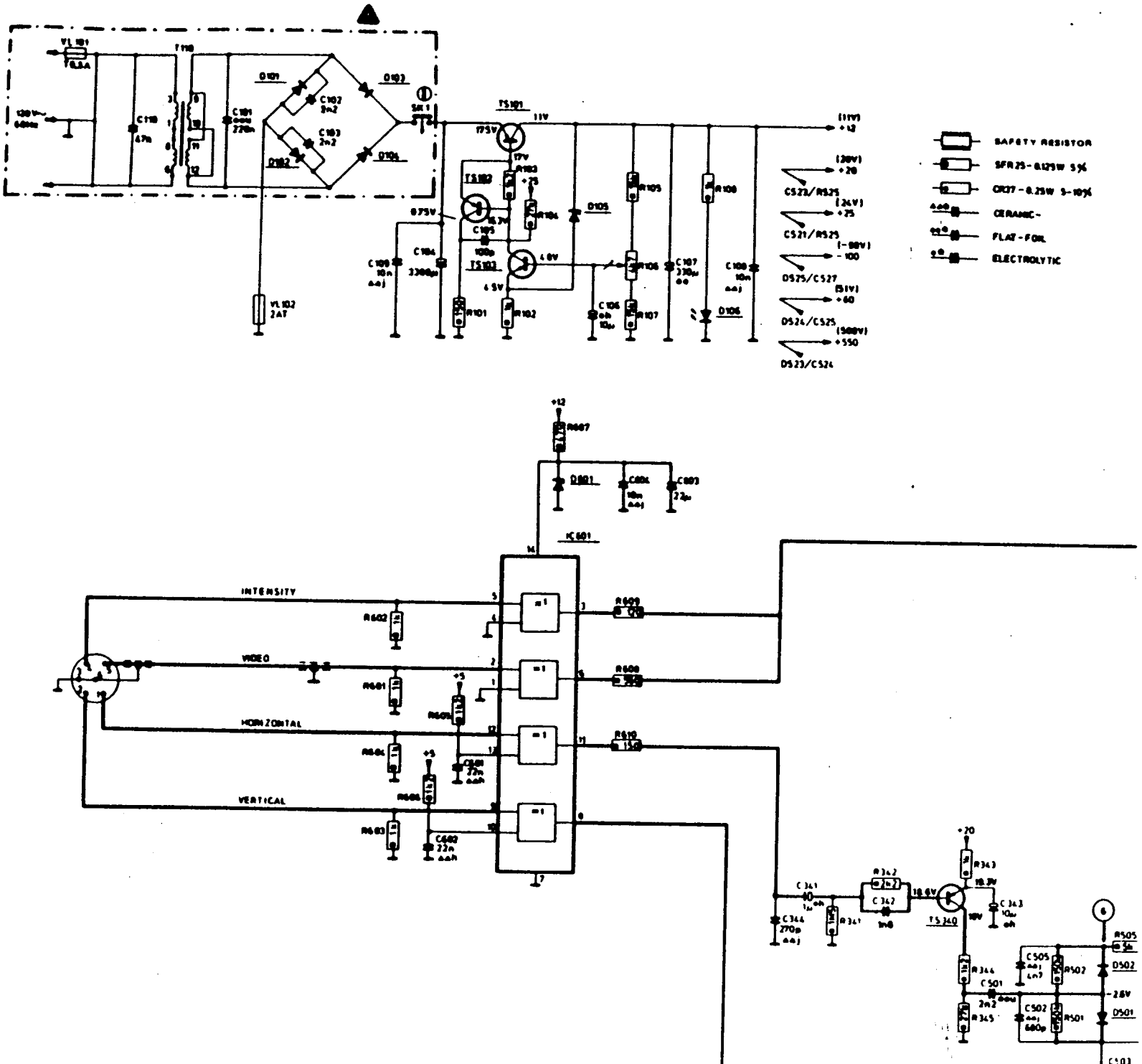
Note 2. The parts, C11 or C15~C21 are not mounted both for EU and USA.

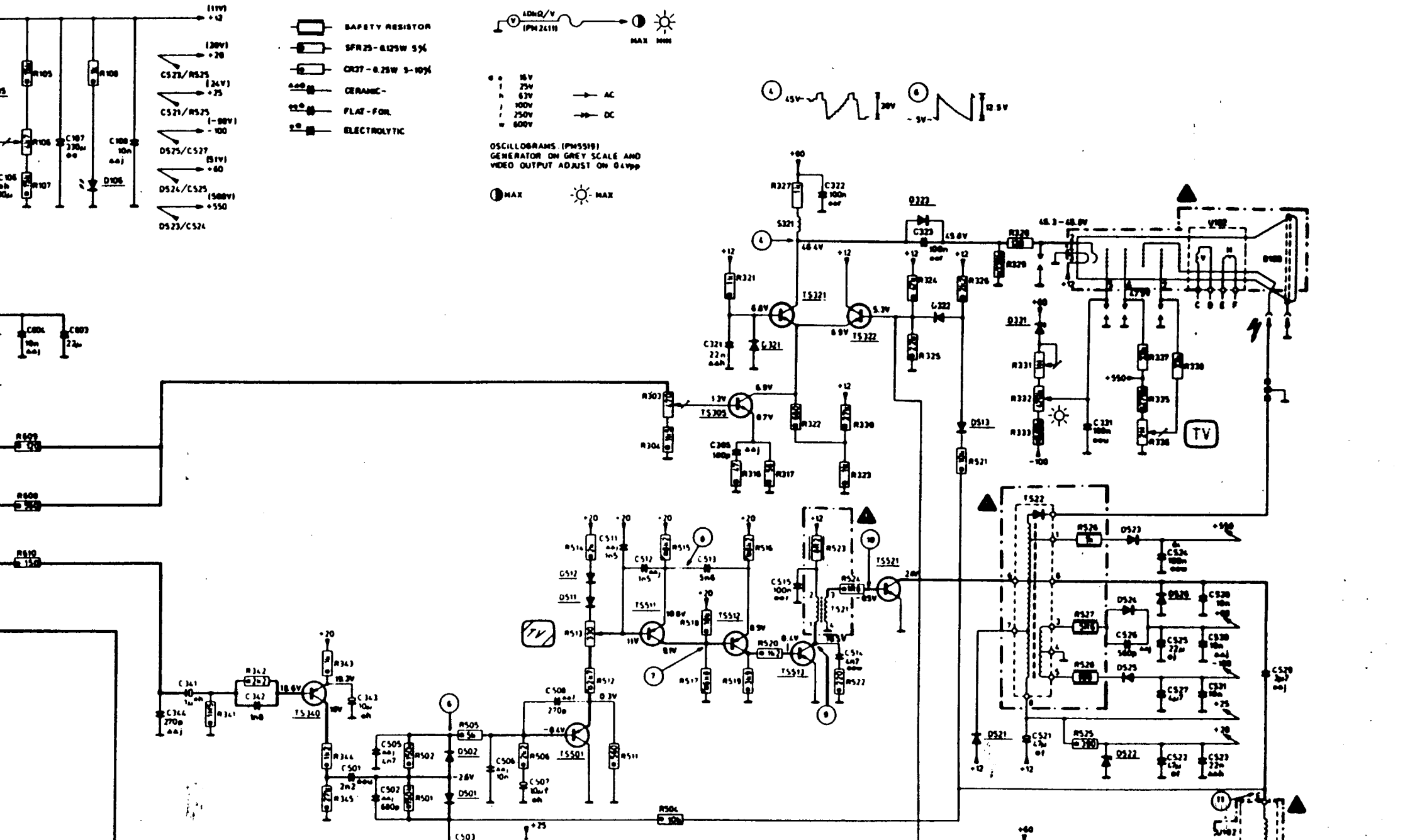


INTERCONNECTION MPS-1200



SCHEMATIC DIAGRAM


SAFETY RESISTOR
MFR25 - 0.125W 5%
CR37 - 0.25W 5-10%
CERAMIC
FLAT-FOIL
ELECTROLYTIC
INTENSITY
VIDEO
HORIZONTAL
VERTICAL


SAFETY RESISTOR
SFR25 - 0.125W 5%
CR37 - 0.25W 5-10%
CERAMIC
FILM - FOIL
ELECTROLYTIC
40kΩ/V
(PM2411)
MAX
AC
DC
OSCILLOGRAMS (PM5519)
GENERATOR ON GREY SCALE AND
VIDEO OUTPUT ADJUST ON 0.4Vpp
TV
TS321
TS322
TS305
TS340
TS501
TS511
TS512
TS513
TS521
TS522
D321
D322
D513
D521
D522
D523
D524
D525
D526
D527
D528
D529
D530
D531
D532
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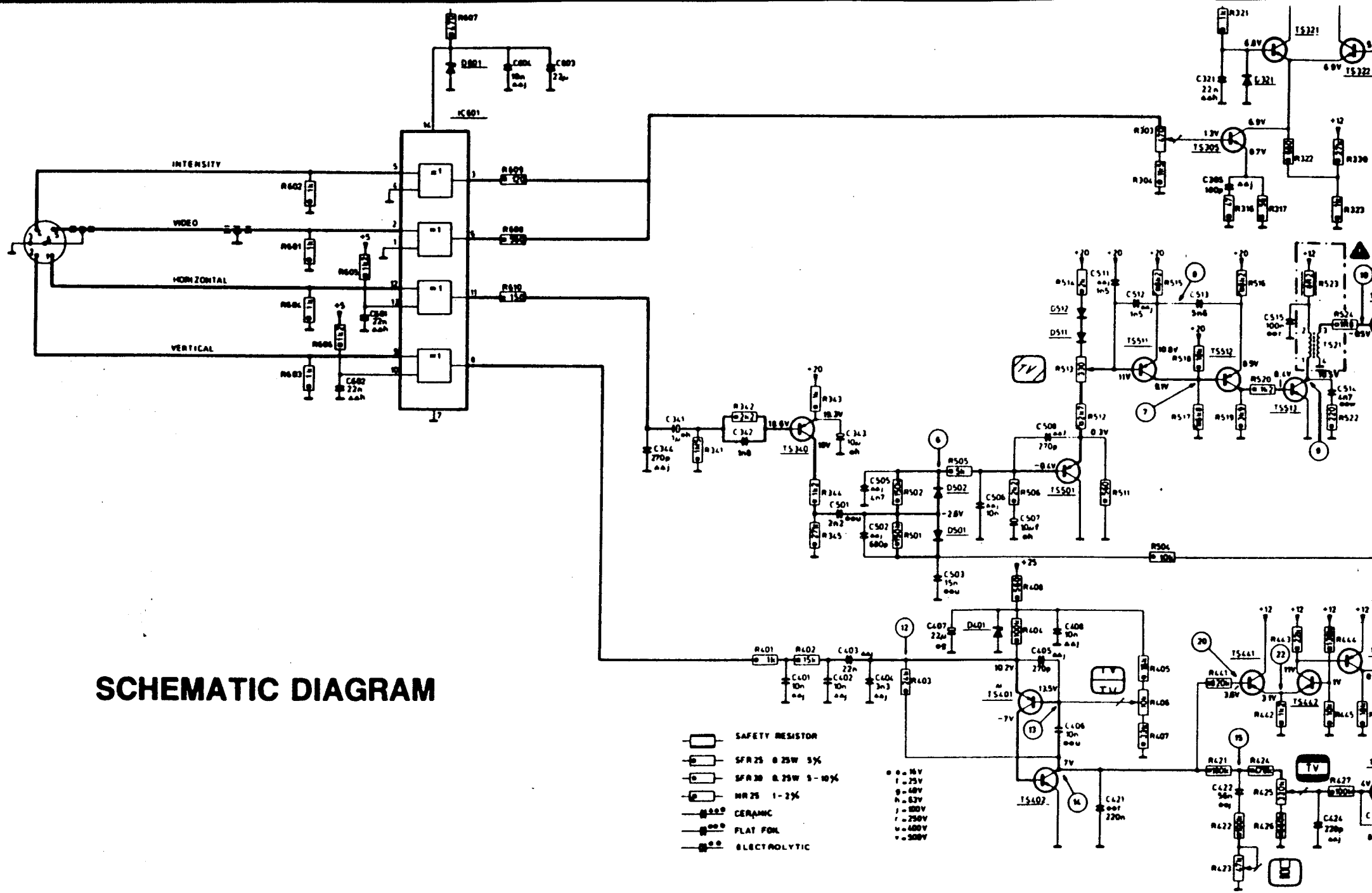
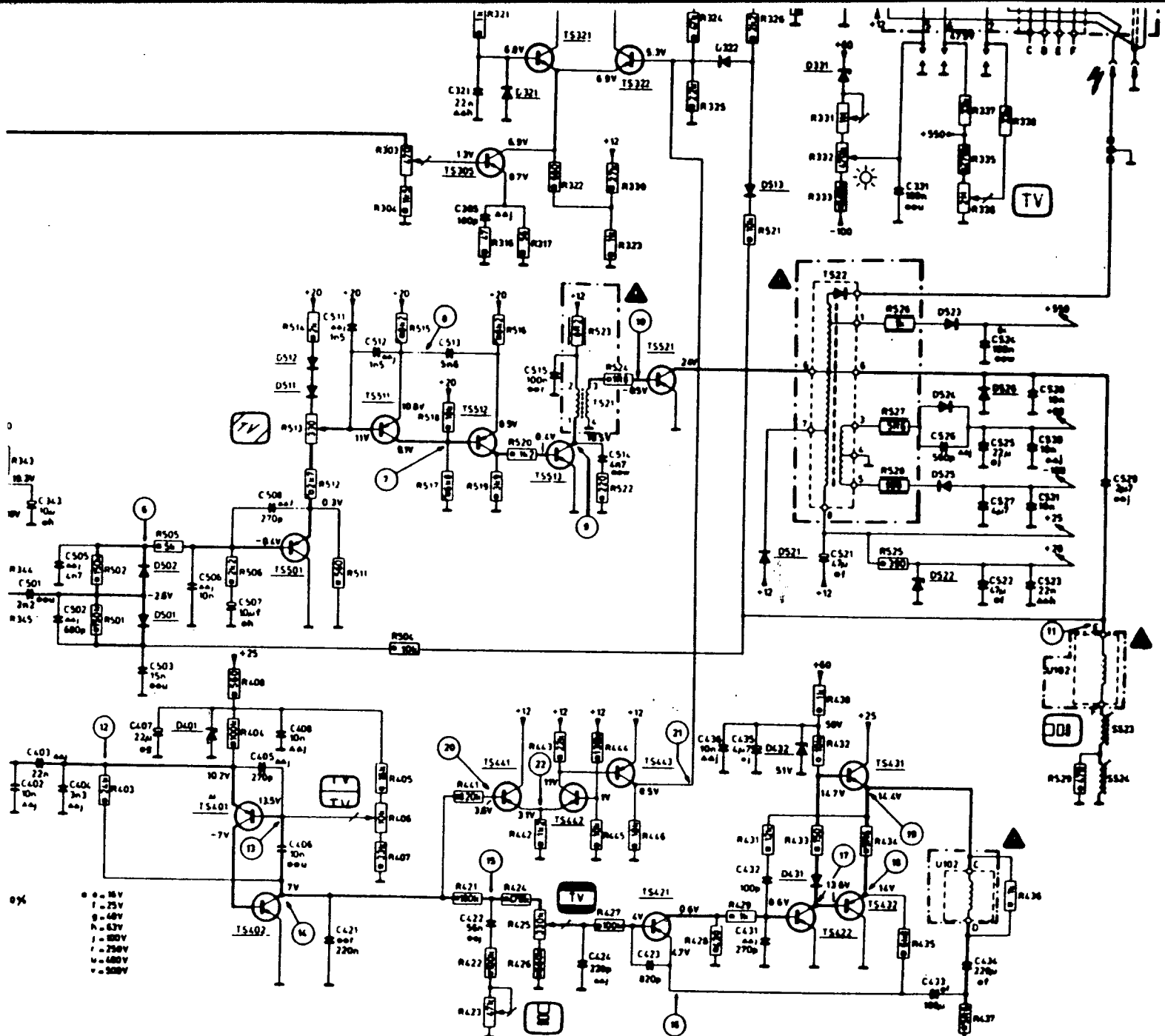
D559
D560

SCHEMATIC DIAGRAM





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CAUTION

USE A SEPARATE ISOLATION TRANSFORMER FOR THIS UNIT WHEN SERVICING.